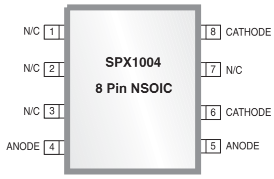
查询SPX1004M-1-2/TR供应商

SPX1004

1.2V / 2.5V Micropower Voltage Reference

FEATURES

- Initial Voltage Tolerance:
  SPX1004-1.2 = ±10mV
  SPX1004-2.5 = ±20mV
- Low Dynamic Impedance
  0.6 Ω Max.
- Low Operating Current:
  SPX1004-1.2 = ±10µA
  SPX1004-2.5 ±20µA
- Wide Operating Current Range
  0.6 Ω Max.
- Direct Replacement for LT1004, LM1004 and AS1004
- Lead Free, RoHS Compliant Packages



APPLICATIONS

- A/D and D/A Reference
- Reference for 5V Systems
- Digital Voltmeter
- Power Supply Monitor

DESCRIPTION

The SPX1004 is a 2-terminal bandgap precision voltage reference that provides a stable fixed output voltage of 1.2V and 2.5V with a tolerance of ±10mV for SPX1004-1.2 and ±20mV for SPX1004-2.5. Design, process and precision on chip trimming yield a very low temperature coefficient of 25 ppm/°C.

The SPX1004 can be used as a pin-to-pin replacement for the LT1004, LM1004 or AS1004. The SPX1004 is available in SOT-89, NSOIC-8 and TO-92 packages over the operating temperature range of 0°C to 70°C.

BLOCK DIAGRAMS

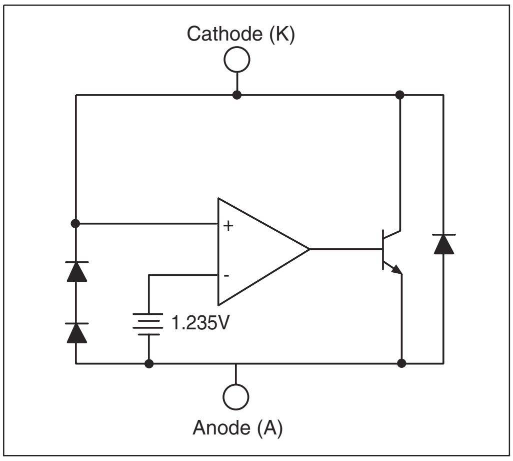


Figure 1a. SPX1004-1.2 Block Diagram

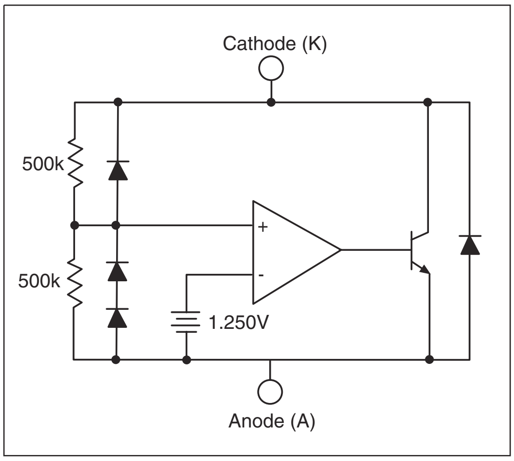


Figure 1b. SPX1004-2.5 Block Diagram

ABSOLUTE MAXIMUM RATINGS

Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Forward Current (I_{AK})..10mA
Reverse Current (I_{KA})..30mA
Lead Temperature (soldering, 10 seconds).................300°C
Storage Temperature Range.......................-65°C to +150°C
Junction Temperature...150°C

Continuous Power Dissipation (P_D)
TO-92...775mW
NSOIC-8..750mW
SOT-89..1000mW

TYPICAL THERMAL RESISTANCES

PACKAGE	θ_{JA}	θ_{JA}	TYPICAL DERATING
TO-92	160°C/W	80°C/W	6.3 mW/°C
NSOIC-8	175°C/W	45°C/W	5.7mW/°C
SOT-89	110°C/W	8°C/W	9.1mW/°C

ELECTRICAL CHARACTERISTICS

Electrical characteristics are guaranteed over full junction temperature range (0°C to 70°C). Ambient temperature must be derated based on power dissipation and package thermal characteristics.

		SPX1004-1.2V			SPX1004-2.5V			
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Reverse breakdown	I_Z=100µA, T_J=25°C	1.225	1.235	1.245	2.480	2.500	2.520	V
	0°C≤T_A≤70°C	1.219	1.235	1.251	2.470	2.500	2.530	
Ave Temp. Coeff.	I_{min}≤I_Z≤20mA		20			60		ppm/°C
Min Operating Current			4	10		12	20	µA
Reverse Breakdown Voltage Change with Current	I_{min}≤I_Z≤1mA		0.5	1		0.5	1	mV
	over temperature		0.5	1.5		0.5	1.5	
	1mA≤I_Z≤20mA		6.5	10		6.5	10	
	over temperature		6.5	20		6.5	20	
Reverse Dynamic Impedance	I_Z=100µA, f=25Hz		0.2	0.6		0.8	0.9	Ω
	over temperature		1	1.5			1.5	
Wide Band Noise	I_Z=100µA, 10Hz≤f≤10kHz		60			120		µV
Long Term Stability	I_Z=100µA, T_A=25°C±0.1°C		20			60		ppm/kHr
Operating Temp Range		0		70	0		70	°C

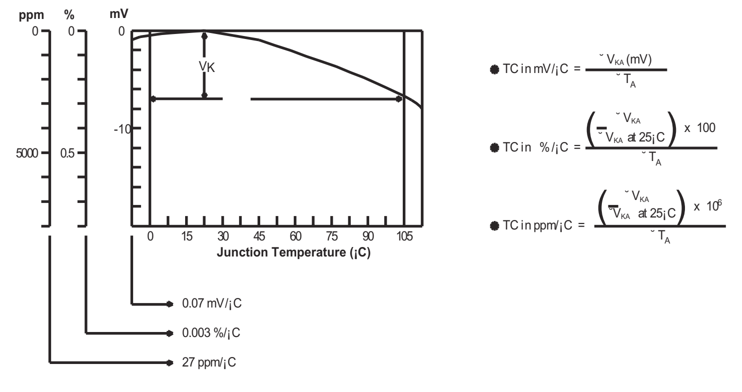


Figure 2. V_{REF} vs Temperature for 2.5V Version

TYPICAL PERFORMANCE CHARACTERISTICS

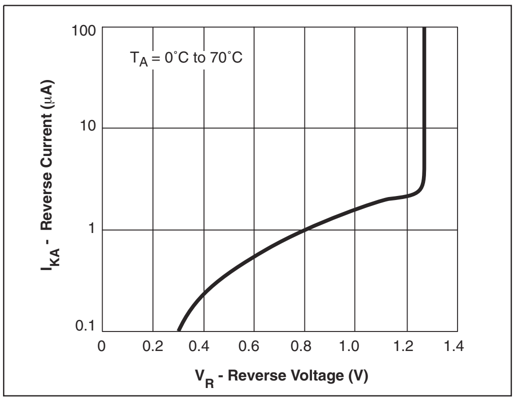


Figure 3. SPX1004-1.2V Reverse Operating Characteristic

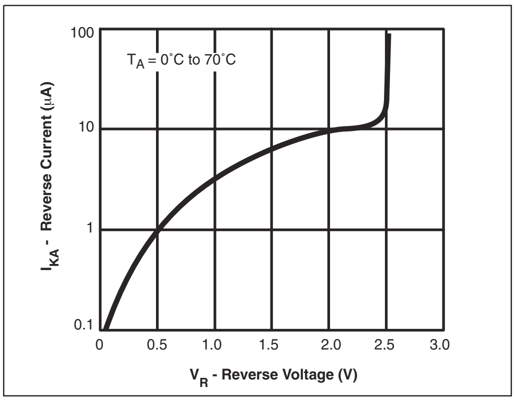


Figure 4. SPX1004-2.5 Reverse Operating Characteristic

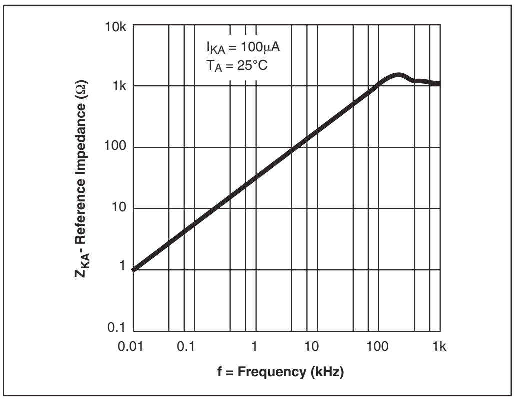


Figure 5. SPX1004-1.2V Reverse Dynamic Impedance

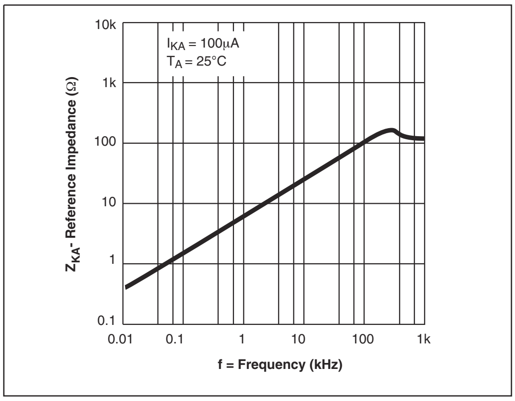


Figure 6. SPX1004-2.5V Reverse Dynamic Impedance

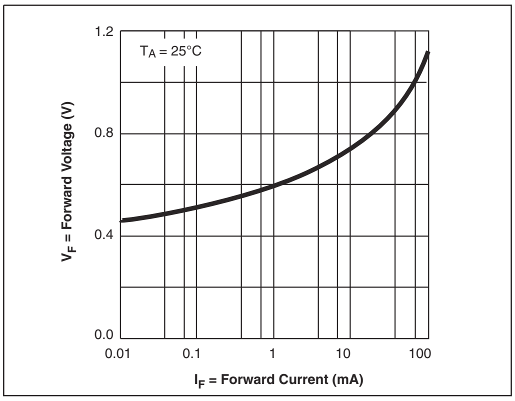


Figure 7. Forward Characteristics for SPX1004-1.2 and SPX1004-2.5

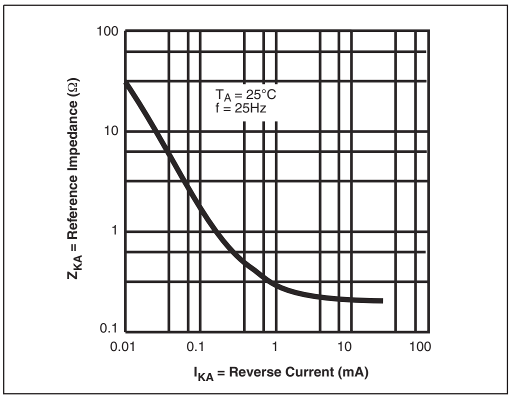


Figure 8. Low Frequency Reverse Dynamic Impedance for SPX1004-1.2

APPLICATION CIRCUITS

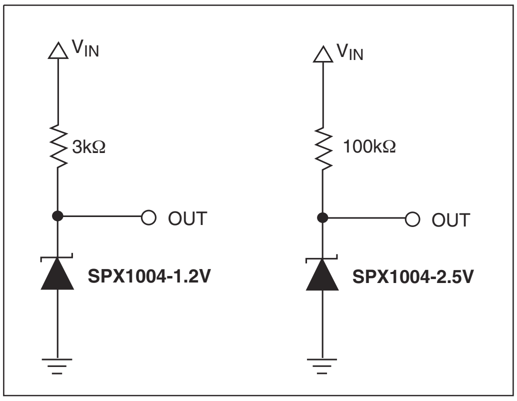

V_{IN}
3kΩ
OUT
SPX1004-1.2V
V_{IN}
100kΩ
OUT
SPX1004-2.5V

Figure 9a. 1.2V Reference, Figure 9b. 2.5V Reference

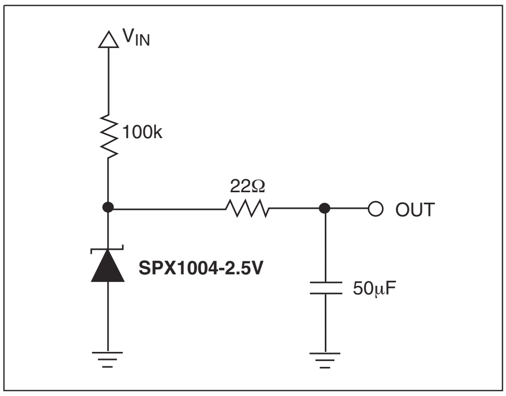

V_{IN}
100k
22Ω
OUT
SPX1004-2.5V
50μF

Figure 10. Low Noise Reference

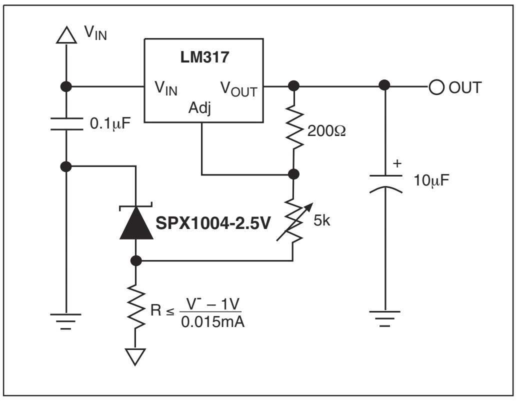

V_{IN}
LM317
V_{IN}
V_{OUT}
Adj
OUT
0.1μF
200Ω
+
10μF
SPX1004-2.5V
5k
$R \leq \frac{V^- - 1V}{0.015mA}$

Figure 11. Variable Output Regulator

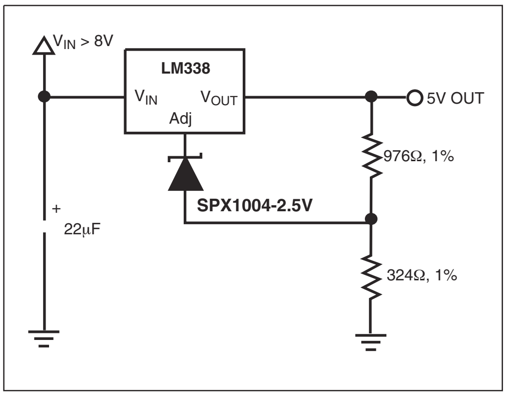

V_{IN} > 8V
LM338
V_{IN}
V_{OUT}
Adj
5V OUT
976Ω, 1%
SPX1004-2.5V
+
22μF
324Ω, 1%

Figure 12. High Stability 5V Regulator

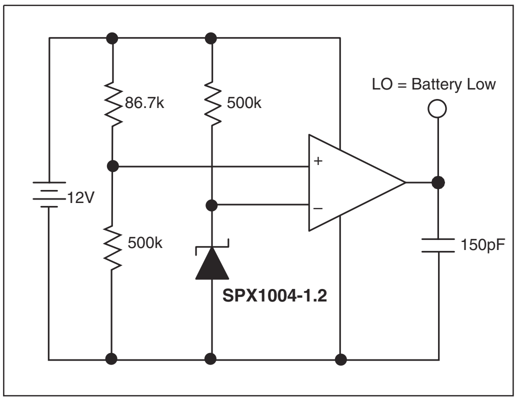

86.7k
500k
LO = Battery Low
+
–
12V
500k
150pF
SPX1004-1.2

Figure 13. Low Battery Detector

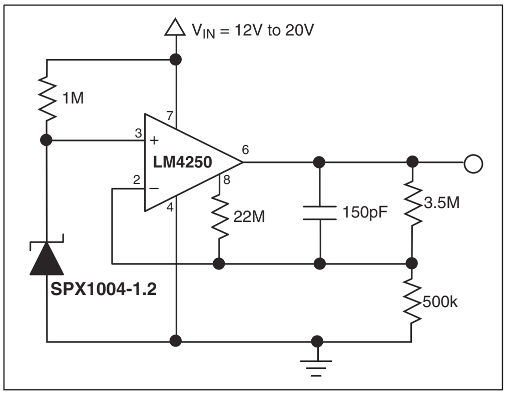
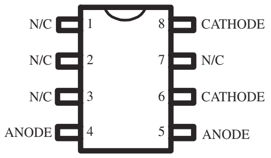

V_{IN} = 12V to 20V
1M
7
3
+
LM4250
6
2
–
8
4
22M
150pF
3.5M
500k
SPX1004-1.2

Figure 14. Micropower 10V Reference

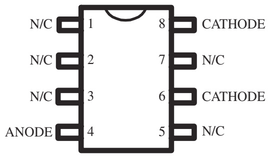
PACKAGE: PINOUTS

NSOIC (S1)


N/C
N/C
N/C
ANODE
1
2
3
4
8
7
6
5
CATHODE
N/C
CATHODE
ANODE

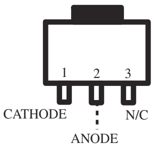
Top View

NSOIC (S2) Alternate Pin Out


N/C
N/C
N/C
ANODE
1
2
3
4
8
7
6
5
CATHODE
N/C
CATHODE
N/C

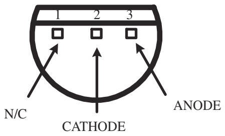
Top View

SOT-89 (M1)


1
2
3
CATHODE
N/C
ANODE

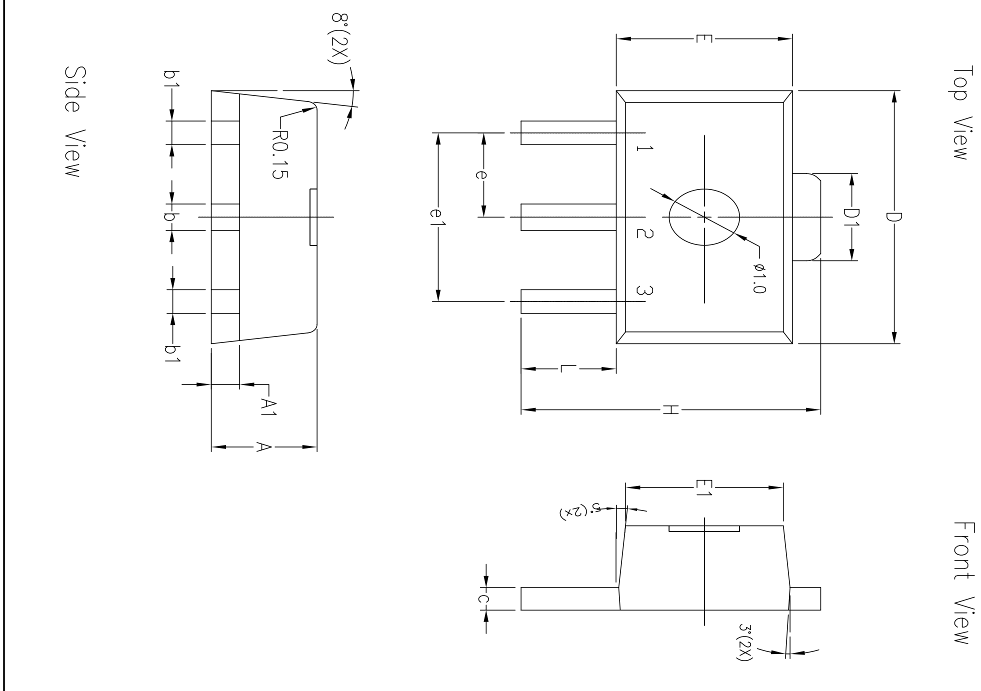
Top View

TO-92 (N)


1
2
3
N/C
CATHODE
ANODE

Bottom View

PACKAGE: 3 PIN SOT-89


Top View
D
D1
ø1.0
E
H
1
2
3
L
e
e1
Front View
E1
3°(2X)
5°(2x)
c
Side View
8°(2X)
R0.15
A1
A
b1
b
b1

3 Pin SOT-89 JEDEC TO-243 Variation AA

SYMBOLS	DIMENSIONS IN MM (Control Unit)			DIMENSIONS IN INCH (Reference Unit)		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.40	1.50	1.60	0.055	0.059	0.063
A1	0.30	0.40	0.50	0.011	0.015	0.019
b	0.44	0.47	0.56	0.017	0.018	0.022
b1	0.36	0.42	0.48	0.014	0.016	0.019
c	0.35	0.40	0.44	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.62	1.60	1.83	0.064	0.062	0.072
E	2.29	2.50	2.60	0.090	0.098	0.102
E1	2.13	—	2.29	0.084	—	0.090
e	1.50 BSC			0.059 BSC		
e1	3.00 BSC			0.118 BSC		
H	3.94	—	4.25	0.155	—	0.167
L	0.89	—	1.20	0.035	—	0.047
N	3			3		

REVISION HISTORY

REV.	DISCRIPTION	DATE	APP'D
A	DRAWING ORIGINATION	02/02/06	JL
B	DRAWING FORMAT MODIFICATION	09/11/06	JL

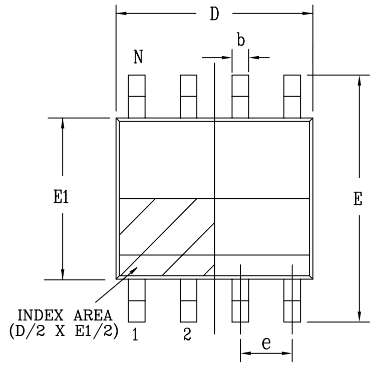
Solved by Sipex

SIPEX CORPORATION

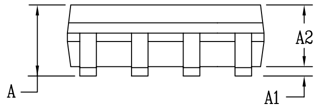
3 PIN SOT-89 PACKAGE OUTLINE

Packaging Approval:		Drawing No:	3-PIN SOT-89
By: JL	Date: 09/11/06	Revision: B	Sheet: 1 OF 1

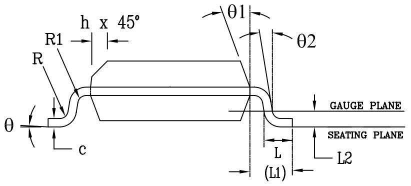
REVISION HISTORY			
REV.	DISCRIPTION	DATE	APP'D
A	DRAWING ORIGINATION	08/16/05	JL
B	DRAWING FORMAT MODIFICATION	07/19/06	JL



Top View



Side View



Front View

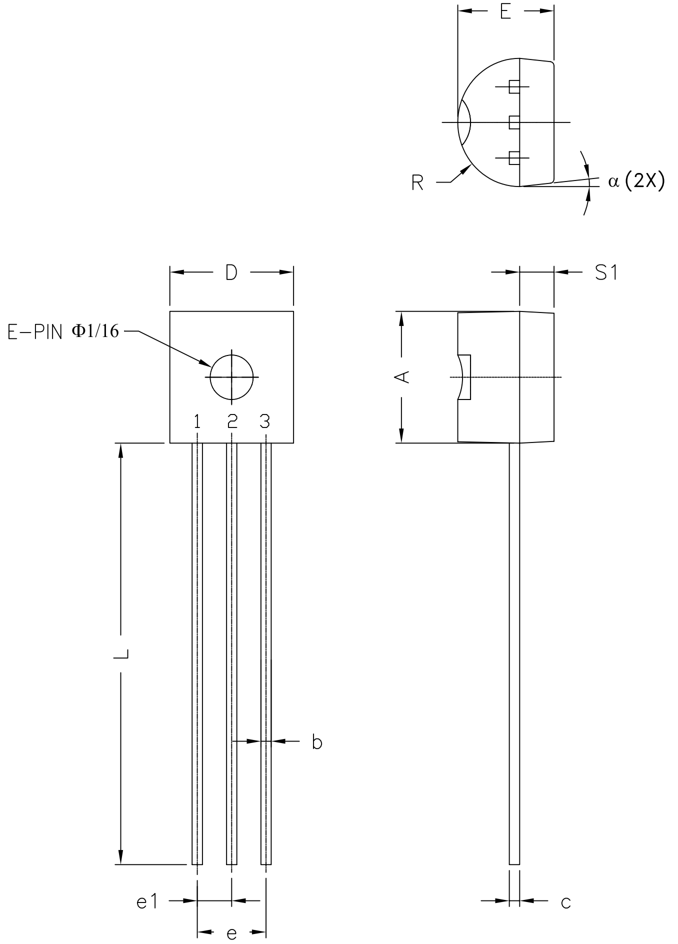
8 Pin SOICN JEDEC MS-012 Variation AA

SYMBOLS	DIMENSIONS IN MM (Control Unit)			DIMENSIONS IN INCH (Reference Unit)		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	—	1.75	0.053	—	0.069
A1	0.10	—	0.25	0.004	—	0.010
A2	1.25	—	1.65	0.049	—	0.065
b	0.31	—	0.51	0.012	—	0.020
c	0.17	—	0.25	0.007	—	0.010
E	6.00 BSC			0.236 BSC		
E1	3.90 BSC			0.154 BSC		
e	1.27 BSC			0.050 BSC		
h	0.25	—	0.50	0.010	—	0.020
L	0.40	—	1.27	0.016	—	0.050
L1	1.04 REF			0.041 REF		
L2	0.25 BSC			0.010 BSC		
R	0.07	—	—	0.003	—	—
R1	0.07	—	—	0.003	—	—
θ	0°	—	8°	0°	—	8°
θ1	5°	—	15°	5°	—	15°
θ2	0°	—	—	0°	—	—
D	4.90 BSC			0.193 BSC		
N	8			8		

Solved by Sipex

		SIPEX CORPORATION	
		8 PIN SOICN PACKAGE OUTLINE	
Packaging Approval:		Drawing No: 8-PIN SOICN	
By: JL	Date: 07/19/06	Revision: B	Sheet: 1 OF 1

REVISION HISTORY			
REV.	DISCRIPTION	DATE	APP'D
A	DRAWING ORIGINATION	09/23/05	JL
B	DRAWING FORMAT MODIFICATION	08/15/06	JL



3 Pin TO-92 JEDEC TO-226-AA				
SYMBOLS	DIMENSIONS IN INCH (Control Unit)		DIMENSIONS IN MM (Reference Unit)	
	MIN	MAX	MIN	MAX
A	0.170	0.210	4.32	5.33
b	0.014	0.020	0.36	0.51
c	0.016	0.022	0.41	0.55
D	0.175	0.205	4.45	5.20
E	0.125	0.165	3.18	4.19
e	0.095	0.105	2.42	2.66
e1	0.045	0.055	1.15	1.39
L	0.500	0.610	12.70	15.49
R	0.045	0.095	2.16	2.41
S1	0.045	0.060	1.14	1.52
α	4°	6°	4°	6°
N	3		3	

Sipex Solved by		SIPEX CORPORATION	
		3 PIN TO-92 PACKAGE OUTLINE	
Packaging Approval:		Drawing No:	3-PIN TO-92
By: JL	Date: 08/15/06	Revision: B	Sheet: 1 OF 1

ORDERING INFORMATION

Part Number	Accuracy	Output Voltage	MSL Level	RoHS	Package	Pack Type	Quantity
SPX1004AS1-L-1-2	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8	TUBE	98
SPX1004AS1-L-1-2/TR	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8	Tape & Reel	2500
SPX1004AS2-L-1-2	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8 Alt. Pinout	TUBE	98
SPX1004AS2-L-1-2/TR	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8	Tape & Reel	2500
SPX1004S1-L-1-2	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8	TUBE	98
SPX1004S1-L-1-2/TR	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8	Tape & Reel	2500
SPX1004S2-L-1-2	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8 Alt. Pinout	TUBE	98
SPX1004S2-L-1-2/TR	0.8%	1.235V	L1 @ 260ºC	Yes	NSOIC8 Alt. Pinout	Tape & Reel	2500
SPX1004AM1-L-1-2	0.8%	1.235V	L2 @ 260ºC	Yes	SOT-89-3	Canister	Any
SPX1004AM1-L-1-2/TR	0.8%	1.235V	L2 @ 260ºC	Yes	SOT-89-3	Tape & Reel	2500
SPX1004M-L-1-2	0.8%	1.235V	L2 @ 260ºC	Yes	SOT-89-3	Canister	Any
SPX1004M-L-1-2/TR	0.8%	1.235V	L2 @ 260ºC	Yes	SOT-89-3	Tape & Reel	2500
SPX1004AN-L-1-2	0.8%	1.235V	No MSL for thru hole package.	Yes	TO-92-3	BOX	Any
SPX1004AN-L-1-2/TR	0.8%	1.235V	No MSL for thru hole package.	Yes	TO-92-3	Tape & Reel	2000
SPX1004N-L-1-2	0.8%	1.235V	No MSL for thru hole package.	Yes	TO-92-3	BOX	Any
SPX1004N-L-1-2/TR	0.8%	1.235V	No MSL for thru hole package.	Yes	TO-92-3	Tape & Reel	2000
SPX1004AS1-1-2	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8	TUBE	98
SPX1004AS1-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8	Tape & Reel	2500
SPX1004AS2-1-2	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8 Alt. Pinout	TUBE	98
SPX1004AS2-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8 Alt. Pinout	Tape & Reel	2500
SPX1004S1-1-2	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8	TUBE	98
SPX1004S1-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8	Tape & Reel	2500
SPX1004S2-1-2	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8 Alt. Pinout	TUBE	98
SPX1004S2-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	NSOIC8 Alt. Pinout	Tape & Reel	2500
SPX1004AM1-1-2	0.8%	1.235V	L1 @ 240ºC	No	SOT-89-3	Canister	Any
SPX1004AM1-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	SOT-89-3	Tape & Reel	2500
SPX1004M1-1-2	0.8%	1.235V	L1 @ 240ºC	No	SOT-89-3	Canister	Any
SPX1004M1-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	SOT-89-3	Tape & Reel	2500
SPX1004M-1-2	0.8%	1.235V	L1 @ 240ºC	No	SOT-89-3	Canister	Any
SPX1004M-1-2/TR	0.8%	1.235V	L1 @ 240ºC	No	SOT-89-3	Tape & Reel	2500
SPX1004AN-1-2	0.8%	1.235V	No MSL for thru hole package.	No	TO-92-3	BOX	Any
SPX1004AN-1-2/TR	0.8%	1.235V	No MSL for thru hole package.	No	TO-92-3	Tape & Reel	2000
SPX1004N-1-2	0.8%	1.235V	No MSL for thru hole package.	No	TO-92-3	BOX	Any
SPX1004N-1-2/TR	0.8%	1.235V	No MSL for thru hole package.	No	TO-92-3	Tape & Reel	2000

ORDERING INFORMATION (continued)

Part Number	Accuracy	Output Voltage	MSL Level	RoHS	Package	Pack Type	Quantity
SPX1004S1-L-2-5	0.8%	2.500V	L1 @ 260ºC	Yes	NSOIC8	TUBE	98
SPX1004S1-L-2-5/TR	0.8%	2.500V	L1 @ 260ºC	Yes	NSOIC8	Tape & Reel	2500
SPX1004S2-L-2-5	0.8%	2.500V	L1 @ 260ºC	Yes	NSOIC8 Alt. Pinout	TUBE	98
SPX1004S2-L-2-5/TR	0.8%	2.500V	L1 @ 260ºC	Yes	NSOIC8 Alt. Pinout	Tape & Reel	2500
SPX1004M1-L-2-5	0.8%	2.500V	L2 @ 260ºC	Yes	SOT-89-3	Canister	Any
SPX1004M1-L-2-5/TR	0.8%	2.500V	L2 @ 260ºC	Yes	SOT-89-3	Tape & Reel	2500
SPX1004M-L-2-5	0.8%	2.500V	L2 @ 260ºC	Yes	SOT-89-3	Canister	Any
SPX1004M-L-2-5/TR	0.8%	2.500V	L2 @ 260ºC	Yes	SOT-89-3	Tape & Reel	2500
SPX1004N-L-2-5	0.8%	2.500V	No MSL for thru hole package.	Yes	TO-92-3	BOX	Any
SPX1004N-L-2-5/TR	0.8%	2.500V	No MSL for thru hole package.	Yes	TO-92-3	Tape & Reel	2000
SPX1004S1-2-5	0.8%	2.500V	L1 @ 240ºC	No	NSOIC8	TUBE	98
SPX1004S1-2-5/TR	0.8%	2.500V	L1 @ 240ºC	No	NSOIC8	Tape & Reel	2500
SPX1004S2-2-5	0.8%	2.500V	L1 @ 240ºC	No	NSOIC8 Alt. Pinout	TUBE	98
SPX1004S2-2-5/TR	0.8%	2.500V	L1 @ 240ºC	No	NSOIC8 Alt. Pinout	Tape & Reel	2500
SPX1004M1-2-5	0.8%	2.500V	L1 @ 240ºC	No	SOT-89-3	Canister	Any
SPX1004M1-2-5/TR	0.8%	2.500V	L1 @ 240ºC	No	SOT-89-3	Tape & Reel	2500
SPX1004M-2-5	0.8%	2.500V	L1 @ 240ºC	No	SOT-89-3	Canister	Any
SPX1004M-2-5/TR	0.8%	2.500V	L1 @ 240ºC	No	SOT-89-3	Tape & Reel	2500
SPX1004N-2-5	0.8%	2.500V	No MSL for thru hole package.	No	TO-92-3	BOX	Any
SPX1004N-2-5/TR	0.8%	2.500V	No MSL for thru hole package.	No	TO-92-3	Tape & Reel	2000

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